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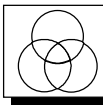
# *"Modularization Approaches: A Critical Assessment"*

Summary of the joint PDMI2-WG33, DIN/NAM 96.4.4 Meeting, Henef / Stadt Blankenberg, 02. - 03. March 1998



**PDMI2 WG 33**
**STEP Methodology and Interoperability**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# Objectives of the Meeting


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☞ **Participants**
- Bernd Ingenbleek, CONCAD GmbH
- Richard Junge, CAAD - TU München
- Günter Staub, RPK - University of Karlsruhe
- Max Ungerer, ProSTEP GmbH

☞ **Objectives**
- technical meeting to review and assess the different modularization approaches / modularization proposals
- develop a position with regard to the agreement / disagreement with the approaches from the viewpoint of DIN/NAM 96.4, PDMI2, IAI
- develop a strategic plan which supports the proposed position

# Relevant Groups of Persons / Roles

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- **Standards developers**
  - task to develop the data models which are subject to standardisation
  - e.g., STEP APs
- **Software vendors**
  - implements the standard data models
  - offers the implementations to specific end-users and/or to the market
  - maintains the implementation
- **End-users**
  - uses the implementation to do their business
- **Funding organizations**
  - identifies voids which lead to the development of standards
  - provides the money necessary to develop standards



# End Users Expectations
## (with respect to Modularization Approaches)

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- **Exchangeability of AP implementations**
  - independent from software vendors
  - “plug’n play” AP implementations
- **Save investments**
  - extensions of (already owned) implementations without loss of investments
- **Reduce “time to market” for AP implementations**
- **Improve quality of AP implementations**
- **Cooperative use of multiple APs (or parts of them)**
  - interoperability of AP implementations

# Software Vendor Expectations
## (with respect to Modularization Approaches)

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- **Ease the implementation of APs**
- **Maximise the reuse of code written for one AP within the implementation of another AP**
- **Increase understandability of APs content**
- **Handle complexity of APs**
  - encapsulation, adequate structuring mechanisms, ...
- **Support of harmonization efforts**
  - no different solutions for same/similar requirements in different APs
- **Minimise redundant test and implementation efforts**
- **Save investments**
  - approach should be on the migration path from the status quo to the future SC4 data architecture



# AP Developers Expectations
## (with respect to Modularization Approaches)

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- **Manage complexity of AP development**
- **Reduce time to standards development**
- **Reuse of common and general “models”**
  - no need for documentation duplication of same / similar requirements
- **Ease the understanding of the content of “alien APs”**
- **Support of harmonisation efforts**
- **“Plug’n play” of data models**
- **Reduce redundant qualification and interpretation**
- **Guidance for identification and scoping of modules, developing moduls, and developing APs using modules**
- **smoother and faster standardization procedure**

# Funding Org. Expectations
## (with respect to Modularization Approaches)

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- **Reduce costs for standards development**
- **Reduce "time to market" for APs**
- **Ease the efforts necessary for harmonisation**
- **Save investments**
  - approach should be on the migration path from the status quo to the future SC4 data architecture

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# General Expectations

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- **Advantages of a modular approach with respect to the status quo should be clearly visible**
- **Do not "generate" expectations which could not be satisfied later on**
- **Approach should be tested on a broad basis**
  - not only one AP in one application realm
  - wide applicability of the approach must be ensured before "standardisation" of the approach
- **Enable a smooth, stepwise encapsulation of a module**
  - choose your own appropriate level of detail when looking at a module

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# Modularization Approaches

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- **STEP AICs**
- **PDES Inc modularization approach**
- **Building block approach (“ship domain”)**
- **IAI architecture (“building and construction domain”)**
  - core model, independent resources, domain models
  - core model has a three layer architecture
  - domains models can be regarded as “midi-sized” APs
    - »scope according to functionality of existing application systems
    - »derived by specialisation of the core model
  - similar approach for domain model development as found in STEP today for AP development
  - no explicit module concept available
- **Other approaches**



# STEP AICs

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- **Characteristics**
  - traditional STEP approach since several years
  - reflects the common usage of IR constructs in multiple application contexts
  - incidental overlaps between two or more APs may lead to the development of an AIC
- **Assessment of the Approach**
  - the reuse thinking in principle available - realization is poor
  - standard in the near future
  - only little acceptance
  - (almost) nobody feels to be responsible for the development of AICs
  - no requirements (as in APs), no mapping table, only the “solution” to the requirements
  - no planning forehand
  - no hierarchical module usage structure (except AIC 511)

# Building Block Approach

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- **Characteristics**
  - tool to organize distributed, concurrent data modelling efforts
  - enable the planning of the scope and content of the shipbuilding suite of APs
  - ensure the interoperability between the shipbuilding suite of APs
  - Import- Export- and Schema, BB-Hierarchy
  - Cookbook available (“how to ...”)
  - domain oriented approach
- **Assessment of the Approach**
  - efficient transition from AP planning to the ARM development
  - within a AP, modules are not longer visible
  - no support of the AP development team for mapping table development, AIM development, ...
  - (expected to) support interoperability between shipbuilding APs

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# Overview

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- **AMs include a harmonized set of requirements, which is lacking in AICs today (AM ≈ AIC + ARM + MT)**
  - it has (almost) all the components of an AP
  - (new) APs are created using a well-defined set of AMs
- **Basic objectives of AICs and AMs are quite similar**
  - Modules: “next Generation AICs”
- **Requirement for normative EXPRESS ARMs in a module**
  - allows use of EXPRESS-X capabilities
- **Compatible with and enforces the AP Interoperability activities**
- **Requires a new set of methods documents**
- **Driver of the approach: AP203 is lacking functionality**

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# Assessment of the PDES Inc. Approach

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- ☞ **Lots of (yet) unresolved issues identified**
- ☞ **only a few methods documents available up to now**
- ☞ **no proof of concept available, no proof of STEP wide applicability - limited to AP203 scope**
- ☞ **No framework for identification of AMs, scoping the AMs available**
- ☞ **High risk of adapting/standardizing now an approach which is not technically sound and limited in scope**
- ☞ **Questionable, if the number of ISO documents for modules to be produced and maintained practical for ISO?**

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# Proposal for Supporting Activities

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**1** ❍ **continuation of PDES Inc. efforts**
»experimental work in the scope of AP203

**2** ❍ **analysing existing APs, identify candidate modules, try to find the nature of modules**
»experimental, inductive work in the scope of STEP (SC4?)

**3** ❍ **conceptual work on guidelines & framework(s) for module identification, module scoping, module development, module usage, extensions to STEP base technologies (EXPRESS, ...)**
»deductive work

❍ **consolidation of the results**

❍ **<u>no</u> mandatory usage of the approach until all activities are successful applied in several, different cases**

❍ **activities can be further supported by**
»AP212/214 harmonization results,
»Yoshikawa work on STEP Framework,
»WG3 “Open Technical Forum“,
»Ship Building BB Approach

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